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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/809,423	03/16/2001	Jens Klein		4925

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EXAMINER	
SODERQUIST, ARLEN	
ART UNIT	**PAPER NUMBER**
1743	

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/809,423	KLEIN ET AL.	
	Examiner	Art Unit	
	Arlen Soderquist	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *39,41,44,45,47,48,50-53,55-62 and 64-76* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *39,41,44,45,48,50-53,55-62 and 65-76* is/are rejected.

7)☒ Claim(s) *47 and 64* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. Claims 47 and 64 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Limiting the first sensor to measuring a temperature or temperature change excludes the limitation found in these claims.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 39, 41, 44-45, 48, 50-53, 55-62 and 65-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turner (US 6,508,984, newly cited and applied in view of Moates, McFarland (US 6,541,271, newly cited and applied) or Willson (either WO 97/32208, Willson '208 or US 6,063,633, Willson '633) and Weinberg (US 5,959,297, newly applied. In the patent Turner teaches a system for creating and testing novel catalyst. A method and system for researching and developing and/or optimizing new catalysts and products in a combinatorial manner is disclosed. The method begins with starting components or a ligand library and provides methods of creating catalyst or product libraries, which are then tested in a reaction of interest. The system uses methods of robotic handling for moving libraries from station to station. The method and apparatus are especially useful for synthesizing, screening, and characterizing combinatorial catalyst libraries, but also offer significant advantages over conventional experimental methods as well. The summary of the invention in column 2 teaches that one or more catalyst libraries are created and the catalyst library is subjected to a reaction of

interest. The reaction of interest may be a screen for activity. The reaction of interest can have process conditions that are combinatorialized, such as varying amounts of reactants or different conditions (such as time, temperature, pressure, atmosphere, etc.). Or particularly relevant to the instant claims, the method optionally provides different screening stages, such as a primary screen to eliminate some members from a library from going on to a secondary screen. Column 3, lines 27-35 teach that the embodiments of are combined into a flexible system that includes a number of different stations including one or more stations for combining starting materials, daughtering the libraries, performing the reactions of interest and screening the results of the process. The system includes a control system that controls, monitors and directs the activities of the system so that a user may design an entire series of experiments by inputting library design, screening or data manipulation criteria. Examples of different types of catalyst libraries are given in columns 7-8. Different infrared screening reactors are described in column 12, line 52 to column 13, line 10. this includes infrared Column 14, lines 24-30 teach other instruments such as GC- Mass Spectrometry that can be used in screening. Figure 2 shows the system with its possibilities. relevant to the instant claims is the description of path Y beginning at column 15 line 54. Path Y shows a research path having multiple reactions and screens. The catalyst library (220) is daughtered into daughter catalyst libraries (222) with the daughter libraries each being screened in a primary screen (110). A primary screen is one that runs the reaction of interest, and provides sufficient data to determine at least whether a catalyst member was active in the reaction of interest or whether a product of interest was formed in the reaction. A primary screen may be one where the catalysts or products are not separated from each other, but subjected together to the reaction of interest in a parallel optical screen. For example, if the reaction of interest is the polymerization of ethylene, the primary screen may be a chamber that allows ethylene to contact all catalyst library members simultaneously. The active catalysts may be identified from the inactive or less active catalysts. The primary screen may be an **infrared screen that identifies active catalysts by heat of reaction**, such as disclosed in copending U.S. patent application Serial No. 08/946,135, filed October 7, 1997. The primary screen may be another optical technique to determine if a product has been made; for example, if the reaction of interest is an emulsion polymerization, the optical screen may determine if an emulsion was created. Other primary screens may be known or developed by those of skill in the art for

specific reactions of interest. Any screen may be a primary screen, however, the object of having a primary screen is to eliminate some of the members (221,223) of the catalyst libraries or daughter catalyst libraries from further, more detailed testing. Since an enormous number of ligands and metal precursors are typically being combined in different routes, it may be that one route is not applicable for a particular metal precursor/ligand combination. A primary screen would eliminate such an inapplicable route at a lower cost than a screen that provides more detailed information. As such primary screens are designed to quickly, effectively and/or efficiently reduce the number of catalyst members that are screened for detailed information (such as conversion and **selectivity** or polymer particle size). Path Y also shows that after the primary screen, members of catalyst libraries (220,222,224) that pass the primary screen are sent to a secondary screen (112). The secondary screen runs the same reaction of interest under conditions that supply more data than the primary screen. Figures 5 and 7 illustrate methodology and apparatus configurations that can be used. While teaching primary and secondary screen options that include the instantly claimed screens (see bold sections above) Turner does not teach the specific combination claimed or the system used on inorganic catalyst libraries.

In the paper Moates teaches infrared thermographic screening of combinatorial libraries of heterogeneous catalysts. A combinatorial library of catalyst candidates, each consisting of a different metal element supported on -alumina, is screened for hydrogen oxidation catalytic activity. Heat liberated on the surface of active catalysts by the catalyzed reaction is detected by noninvasive IR thermography. A 16-candidate library identifies four distinctly active pellets, which correspond to active formulations known from the literature. A higher density library shows similar results, but heat and mass transport effects influence the pellet temperatures. This method may be used to screen and optimize catalyst formulations more efficiently and quickly than current methods and may also be useful for study of operational lifetime, resistance to poisons, and regenerability.

The McFarland patent resulted from the application referenced by Turner as an infrared screen that identifies active catalysts by heat of reaction. In particular figure 4 shows a reaction chamber that monitors thermal emission due to a reaction occurring therein. Columns 6-7 teach various types of catalyst including inorganic types. The discussions of figure 3-5 teach that this is a good technique to monitor or screen large numbers of catalysts.

Both Willson '208 and Willson '633 come from the same application and therefore contain the same disclosure. While this explanation of the Willson references will refer to the Willson '633 patent, corresponding disclosure is found in the Willson '208 application. Willson '633 teaches a catalyst testing process and apparatus. In column 1 lines 27-40, Willson '633 teaches that catalyst testing was conventionally accomplished in bench scale or larger pilot plants in which the feed is contacted with a catalyst under reaction conditions, generally with effluent products being sampled, often with samples being analyzed and results subjected to data resolution techniques. Those procedures can take a day or more for a single run on a single catalyst. While those techniques have value in fine-tuning the optimum matrices, pellet shape, etc., the Willson '633 invention permits the scanning of dozens of catalysts in a single set-up, ***often in less time than required for a single catalyst to be evaluated by conventional methods***. Further, when practiced in its preferred robotic embodiments, the invention can sharply reduce the labor costs per catalyst screened. In the apparatus and method a multicell holder e.g. a honeycomb (microchannel array) or plate, or a collection of individual support particles, is treated with solutions/suspensions of catalyst ingredients to produce cells, spots or pellets holding each of a variety of combinations of the ingredients, is dried, calcined or treated as necessary to stabilize the ingredients in the cells, spots or pellets, then is contacted with a potentially reactive feed stream or batch e.g., biochemical, gas oil, hydrogen plus oxygen, propylene plus oxygen, $CC1_2F_2$ and hydrogen, etc. The reaction occurring in each cell can be measured, e.g. by infrared thermography, spectroscopic detection of products or residual reactants, or by sampling, e.g. by multistreaming through low volume tubing, from the vicinity of each combination, followed by analysis e.g. spectral analysis, chromatography etc, or by observing temperature change in the vicinity of the catalyst e.g. by thermographic techniques, to determine the relative efficacy of the catalysts in each combination. Robotic techniques can be employed in producing the cells, spots, pellets, etc. Columns 2-3 summarize some of the aspects of the invention including reaction types, sensors, catalyst taggants and reactions conditions. The reaction types include any reaction enhanced by the presence of a catalyst such as polymerization reactions, halogenation, oxidation, hydrolysis, esterification, reduction and any other conventional reaction which can benefit from a catalyst. Hydrocarbon conversion reactions, as used in petroleum refining are an important use of the invention and include

reforming, fluid catalytic cracking, hydrogenation, hydrocracking, hydrotreating, hydrodesuilirizing, alkylation and gasoline sweetening. The sensors used to detect catalytic activity in the candidate catalysts include chromatographs, temperature sensors, and spectrometers. Especially those adapted to measure temperature and/or products near each specific catalyst spot e.g. by multistreaming, multitasking, sampling, fiber optics, or laser techniques such as thermography, as by an infrared camera recording the temperature at a number of catalyst sites simultaneously, NMR, NIR, TNIR, electrochemical, fluorescence detectors, Raman, flame ionization, thermal conductivity, mass, viscosity and stimulated electron or X-ray emission. Optionally taggants (labels) can be added to identify particular catalysts, particularly where particles are employed as supports for the catalysts. These taggants can be conventional as discussed in the literature. Taggants can be chemicals that are stable at reaction conditions or can be radioactive with distinctive emissions. The techniques of combinatorial chemistry will be applicable with taggants as well as with catalysts chosen to suit the particular reaction to be enhanced by the catalyst (some of the samples are selected based on the results). Temperatures, pressures, space velocities and other reaction conditions can be varied and will be determined by the reactants and reaction. The intent of the process is to screen for catalysts having improved properties for a desired reaction. Example 3 shows the selection being based on the presence of carbon dioxide in the product stream by using an appropriate wavelength of infrared radiation. Example 5 teaches the particles showing activity being collected and analyzed for the content of labeling materials to determine the composition of the material giving the desired catalytic activity. Willson '633 does not give examples of using two analysis methods together or selecting a subset of the total candidates for a second analysis method.

In the patent Weinberg teaches mass spectrometers and methods for rapid screening of libraries of different materials. Methods and apparatus for screening diverse arrays of materials are provided. Techniques are provided for rapidly characterizing compounds in combinatorial arrays of materials for discovering and/or optimizing new materials with specific desired properties. A scanning mass spectrometer is used which includes an ionization chamber and a collector that outputs an electrical signal responsive to the quantity of gas ions contacting the collector surface. A conduit system selectively withdraws samples from the array of materials, passing the samples into the ionization chamber. In a specific embodiment, reactants are passed

through the conduit system to the selected regions of interest on the substrate. Figures 13-14 illustrate a methods of employing a differentially pumped mass spectrometer for sampling a product stream or volume surrounding a library compound. Column 5, lines 35-37 teach that the system can identify activity or selectivity (a desired product).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an infrared screen method as taught by Moates, McFarland or Willson '633, Willson '203 as the primary screen of Turner and the screen of Weinberg as the secondary screen of Turner because of the citation of McFarland by Turner as a primary screening method or the ability to select catalyst formulations having a desired activity from a large number of catalysts as taught by Moates, McFarland or Willson '633, Willson '203 and as required for the primary screen of Turner. It would have been obvious to one of ordinary skill in the art at the time the invention was made to the screen of Weinberg or a monitor capable of monitoring selectivity from those taught by Willson '633, Willson '203 as the secondary screen of Turner because of the ability to monitor a desired product (selectivity) as required for the secondary screen of Turner. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the device and method of Turner to screen inorganic catalysts because as shown by Willson '633, Willson '203 the techniques are not limited to one type of catalyst.

4. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additionally cited art relates to catalyst screening.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arlen Soderquist whose telephone number is (571) 272-1265. The examiner can normally be reached on Monday-Thursday and Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Arlen Soderquist
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